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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,750	05/26/2006	Richard M. Jenkins	06-379	1282
20306 7590 05/18/2007 MCDONNELL BOEHNEN HULBERT & BERGHOFF LLP 300 S. WACKER DRIVE 32ND FLOOR CHICAGO, IL 60606			EXAMINER HUGHES, DEANDRA M	
			ART UNIT 3663	PAPER NUMBER
			MAIL DATE 05/18/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,750	JENKINS ET AL.	
	Examiner	Art Unit	
	Deandra M. Hughes	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/19/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed 5/26/06 has been entered.

Information Disclosure Statement

2. The information disclosure statement (IDS) filed on 10/19/06 has been considered by the examiner and is found to be cumulative to the art of record.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 7, 9, 12-13, 17-18, 23, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Delavaux (US5,253,104 published Oct. 12, 1993).

With regard to claim 1, Delavaux discloses an optical amplifier (e.g., fig. 1) comprising:

- at least two sections of amplifying optical fiber (#34 and #36);
- pumping means for optically pumping the at least two sections of amplifying optical fiber (P1 and P2);
- and an optical fiber support means (#12) for holding the at least two sections of amplifying fiber substantially straight during use (this is inherent; otherwise multiplexing would not work because the alignment would be off)

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- wherein the optical fiber support means additionally comprises means to couple light between the at least two sections of amplifying fiber (note the dotted line in figure 1 wherein the light is coupled from port 18 to port 20).

With regard to claim 2, the channels are where the fibers for the transmission of P1 and P2 sit.

With regard to claim 3, the channels are substantially parallel and folded (fig. 1, #12).

With regard to claim 7, either #24 or #28 may be the alignment slot.

With regard to claim 9, #18, #24, #28, or #20 may be the fiber end attachment means.

With regard to claims 12-13, the plurality of pump beams P1 and P2 are routed to each amplifier separately.

With regard to claim 17, the amplifiers are rare earth doped (col. 4, line 33).

With regard to claim 18, S_{in} is the input beam coupled via #30.

With regard to claim 23, the pumping means are lasers (col. 3, line 49).

With regard to claim 27, P1 and P2 are the array of laser diodes.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 4, 8, 14, 16, 19-22, are rejected under 35 U.S.C. 103(a) as being unpatentable over Delavaux in view of Naganuma (US 6,310,717 published Oct. 30, 2001).

With regard to claim 4, Delavaux does not specifically disclose a rectangular channel cross section. However, Naganuma discloses a substantially rectangular channel cross section (e.g. #44). It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to use a substantially rectangular cross section for the advantage of maintaining a stable alignment.

With regard to claims 8 and 19, Delavaux does not specifically disclose a lens retained in at least one alignment slot. However, Naganuma discloses lenses retained in the alignment slots (e.g. #52). It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to use a lens in the alignment slot for the advantage of collimating the beam.

With regard to claim 14, Delavaux does not specifically disclose that the core diameter of the amplifying fiber is 50 microns. However, Naganuma teaches a mode field diameter of 10 microns (col. 6, lines 38-40). It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to use a fiber with a MFD of 10 microns of the advantage of multimode propagation.

With regard to claims 16 and 20-22, Delavaux does not specifically disclose that the amplifying fiber is single mode fiber. However, Naganuma teaches single mode optical amplifying fiber (col. 6, line 39) which inherently predominantly excites the

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fundamental mode of propagation. It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to use single mode optical amplifying fiber for the advantage of reduced noise.

7. Claims 5-6 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delavaux in view of Geusic (US 2003/0197186 filed May 8, 2003).

With regard to claims 5-6 and 10, Delavaux does not specifically disclose that the means of coupling the light comprises one or more hollow core optical waveguides with reflective coating formed in a semiconductor substrate. However, Geusic teaches hollow core optical waveguides formed in a semiconductor substrate (hollow waveguide is #112a, reflective coating is #110a; semiconductor substrate is disclosed in [0029]). It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to use the hollow waveguides with a reflective coating in a semiconductor substrate for the advantage of modularity.

With regard to claim 11, Delavaux does not specifically disclose deep reactive ion etching as a means of forming the channels. However, Geusic teaches deep reactive ion etching as a means of forming the channels ([0030]). It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to use deep reactive ion etching as a means of forming the channels for the advantage of a trench with a high aspect ratio.

8. Claims 15 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delavaux in view of Bricheno (US 5,574,811 published Nov. 12, 1996).

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With regard to claims 15 and 24, Delavaux does not specifically disclose that a section of optical amplifying fiber is a multimode fiber. However, Bricheno teaches coupling of multimode fibers via a semiconductor substrate (col. 1, lines 25-57). It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to use multimode fibers for the advantage of WDM propagation.

9. Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delavaux in view of Bricheno, as applied to claim 24 above, and further in view of Naganuma.

Delavaux in view of Bricheno does not specifically disclose the claimed numerical aperture and a collimating lens. However, Naganuma teaches the claimed numerical aperture (col. 6, line 41 and #52). It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to use the numerical aperture and lens of Naganuma for the advantage of collimating the light beam.

10. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delavaux in view of Yoo (US 6,768,827 filed Feb. 22, 2002).

Delavaux does not specifically disclose that the reflective elements form a resonant cavity. However, Yoo teaches forming a resonant cavity on a coupling semiconductor substrate (fig. 20). It would have been obvious to one of ordinary skill in the art (e.g. an optical engineer) at the time the invention was made to form a resonant cavity on the substrate for the advantage of lasing.


Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deandra M. Hughes whose telephone number is 571-272-6982. The examiner can normally be reached on M-F, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Deandra M Hughes
Primary Examiner
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